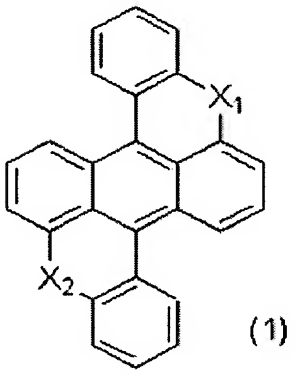
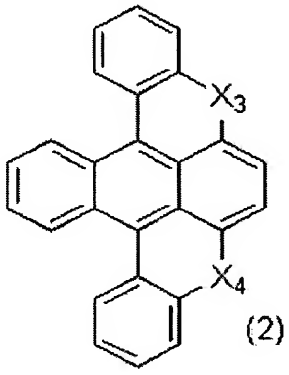
CLAIMS

1. A light-emitting device emitting light by electric energy having one or more layers of organic thin films formed between an anode and a cathode, characterized in that the organic thin film contains a compound having the basic skeleton represented by the following General Formula (1) or (2):



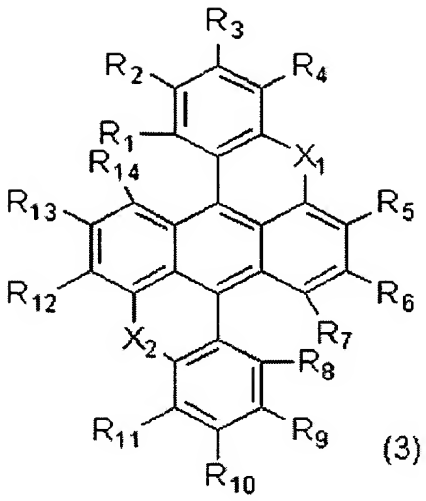
(1)



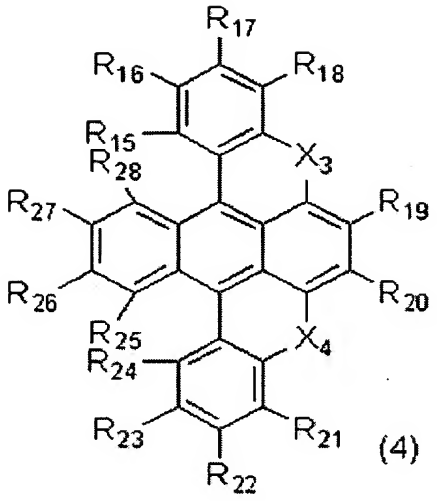
(2)

(wherein, X_1, X_2, X_3 and X_4 each independently represent an oxygen, sulfur, selenium, or tellurium atom, or NR_{29}; and R_{29} represents a hydrogen atom, an aliphatic hydrocarbon residue which may be substituted, or an aromatic residue which may be substituted.).

2. The light-emitting device according to Claim 1, wherein the compound having the basic skeleton represented by Formula (1) or (2) is a compound represented by the following General Formula (3) or (4):



(3)



(4)

(wherein, X_1, X_2, X_3 and X_4 each are the same as those in Formulae (1) and (2); R_1 to R_{28} each independently represent a hydrogen atom or a substituent group; and the neighboring groups among the substituent groups represented by R_1 to R_{14} and R_{29} in Formula (3) and R_{15} to R_{29} in Formula (4) may bind to each other forming a ring(s) which may be substituted.)

3. The light-emitting device according to Claim 2, wherein X_1, X_2, X_3 and X_4 in Formula (3) or (4) each represent an oxygen or sulfur atom.

4. The light-emitting device according to Claim 2 or 3, wherein the neighboring groups among R_1 to R_4, R_8 to R_{11}, R_{15} to R_{18}, and R_{21} to R_{24} in Formula (3) or (4) bind to each other, forming a ring(s) which may be substituted.

5. The light-emitting device according to any one of Claims 2 to 4, wherein R_1 and R_2 and/or R_3 and R_4 and/or R_8 and R_9 and/or R_{10} and R_{11} and/or R_{15} and R_{16} and/or R_{17} and R_{18} and/or R_{21} and R_{22} and/or R_{23} and R_{24} in Formula (3) or (4) bind to each other, forming an aromatic ring(s) which may be substituted.

6. The light-emitting device according to any one of Claims 2 to 5, wherein the substituent groups represented by R_1 to R_{29} in Formula (3) or (4) each are a substituted or unsubstituted aliphatic hydrocarbon residue or a substituted or unsubstituted aromatic residue.

7. The light-emitting device according to any one of Claims 2 to 6, wherein the substituent groups represented by R_1 to R_{29} in Formulae (3) and (4) each are a halogen atom, an aromatic residue having a halogen atom, or an aliphatic hydrocarbon residue having a halogen atom.

8. The light-emitting device according to Claim 7, wherein the halogen atom is a bromine or fluorine atom.

9. The light-emitting device according to any one of Claims 2 to 8, wherein:
X_1 and X_2 in the compound represented by Formula (3) each independently represent an oxygen or sulfur atom;
R_1 represents H, F, CH_3, Ph, or CF_3;
R_2 represents H, CH_3, C_2H_5, t-C_4H_9, Cy, Ph, MPh, Np, Th, Py, OCH_3,

OPh, F, Cl, Br, I, CN, $N(CH_3)_2$, CHO, COOH, $COOCH_3$, COOPh, COPh, or CF_3;

R_3 represents H, CH_3, C_2H_5, t-C_4H_9, OCH_3, OPh, NO_2, OH, F, CF_3, C_2F_5, or Ph;

R_4 represents H, CH_3, C_2H_5, t-C_4H_9, Cy, Ph, MPh, Np, Th, Py, OCH_3, OPh, F, Cl, Br, I, CN, $N(CH_3)_2$, CHO, COOH, $COOCH_3$, COOPh, COPh, or CF_3;

R_8 represents H, F, CH_3, Ph, or CF_3;

R_9 represents H, CH_3, C_2H_5, t-C_4H_9, Cy, Ph, MPh, Np, Th, Py, OCH_3, OPh, F, Cl, Br, I, CN, $N(CH_3)_2$, CHO, COOH, $COOCH_3$, COOPh, COPh, or CF_3;

R_{10} represents H, CH_3, C_2H_5, t-C_4H_9, OCH_3, OPh, NO_2, OH, F, CF_3, C_2F_5, or Ph;

R_{11} represents H, CH_3, C_2H_5, t-C_4H_9, Cy, Ph, MPh, Np, Th, Py, OCH_3, OPh, F, Cl, Br, I, CN, $N(CH_3)_2$, CHO, COOH, $COOCH_3$, COOPh, COPh, or CF_3; and

R_5 to R_7 and R_{12} to R_{14} are H,

(wherein, Ph represents a phenyl group; MPh, a 4-methylphenyl group; Np, a naphthyl group; Th, a 2-thienyl group; Py, a 2-pyridyl group; and Cy, a cyclohexyl group.).

10. The light-emitting device according to any one of Claims 2 to 9, wherein the organic thin film has a laminate structure at least containing a positive hole-transporting layer and a light-emitting layer.

11. The light-emitting device according to any one of Claims

1 to 10, wherein an anode, a positive hole-transporting layer, a light-emitting layer, an electron-transporting layer, and a cathode are laminated in that order.

12. The light-emitting device according to any one of Claims 1 to 11, wherein at least a positive hole-injecting layer, a positive hole-transporting layer, and an electron-transporting layer are formed between the anode and the cathode.

13. The light-emitting device according to any one of Claims 1 to 12, wherein the compound having the basic skeleton represented by Formula (1) or (2) is contained as the host material of the light-emitting material in the light-emitting layer.

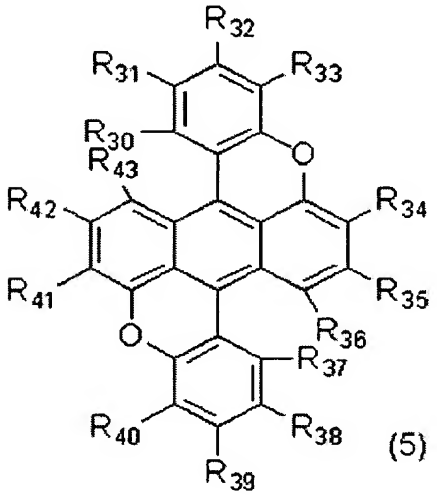
14. The light-emitting device according to any one of Claims 1 to 13, wherein the compound having the basic skeleton represented by Formula (1) or (2) is contained as the dopant for the light-emitting layer.

15. The light-emitting device according to any one of Claims 1 to 14, wherein a white light is emitted by combined use of a blue to green light-emitting material.

16. The light-emitting device according to any one of Claims 1 to 15, wherein the positive hole-injecting layer according to Claim 12 contains a compound having the basic skeleton represented by the Formula (1) or (2).

17. The light-emitting device according to any one of Claims 1 to 16, wherein the light-emitting device is a device for a display in a matrix mode and/or a segment mode.

18. A condensed polycyclic compound represented by Formula (5):



(5)

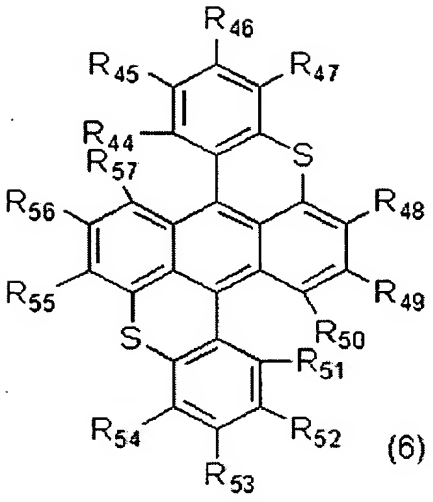
(wherein, R_{30} to R_{43} each independently represent a hydrogen atom, a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group, or a halogen atom, or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group, or a halogen atom; at least one of R_{30} to R_{43} is a halogen atom or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group or a halogen atom; and the neighboring groups among R_{30} to R_{43} may bind to each other forming a ring(s) which may be substituted, however excluding the case

where R_{30} and R_{31} and R_{37} and R_{38}, or R_{32} and R_{33} and R_{39} and R_{40}, bind to each other forming unsubstituted benzene rings and all of R_{30} to R_{43} that do not form a ring are a hydrogen atom.).

19. The condensed polycyclic compound according to Claim 18, wherein two or more of R_{30} to R_{43} each are a halogen atom or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group, or a halogen atom.

20. The condensed polycyclic compound according to Claim 18 or 19, wherein the substituent groups R_{34}, R_{35}, R_{36}, R_{41}, R_{42}, and R_{43} on the compound represented by Formula (5) each are a hydrogen atom; R_{30} and R_{37} each represent a hydrogen atom, a halogen atom, or a C1 to C4 alkyl group; R_{31}, R_{33}, R_{38}, and R_{40} each represent a hydrogen atom, a halogen atom, an aromatic residue, a thienyl group, or a C1 to C4 alkyl group; and R_{32} and R_{39} each represent a hydrogen atom, a halogen atom, or a C1 to C4 alkyl group.

21. A condensed polycyclic compound represented by Formula (6):



(6)

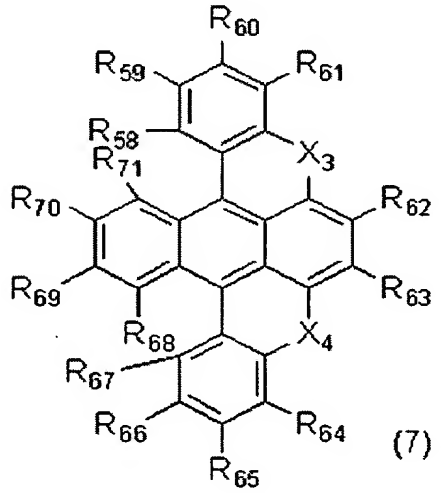
(wherein, R_{44} to R_{57} each independently represent a hydrogen atom, a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group or a halogen atom, or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group, or a halogen atom; at least one of R_{44} to R_{57} is a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group or a halogen atom, or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group, or a halogen atom; and the neighboring groups among R_{44} to R_{57} may bind to each other forming a ring(s) which may be substituted.).

22. The condensed polycyclic compound according to Claim 21, wherein two or more of R_{44} to R_{57} each are a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group or a halogen atom, or

an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group, or a halogen atom.

23. The condensed polycyclic compound according to Claim 21 or 22, wherein the substituent groups R_{48}, R_{49}, R_{50}, R_{55}, R_{56}, and R_{57} of the compound represented by Formula (6) each represent a hydrogen atom; R_{44} and R_{51} each represent a hydrogen atom, a halogen atom, or a C1 to C4 alkyl group; R_{45}, R_{47}, R_{52}, and R_{54} each represent a hydrogen atom, a halogen atom, an aromatic residue, a thienyl group, or a C1 to C4 alkyl group; and R_{46} and R_{53} each represent a hydrogen atom, a halogen atom, or a C1 to C4 alkyl group.

24. A condensed polycyclic compound represented by the following General Formula (7):

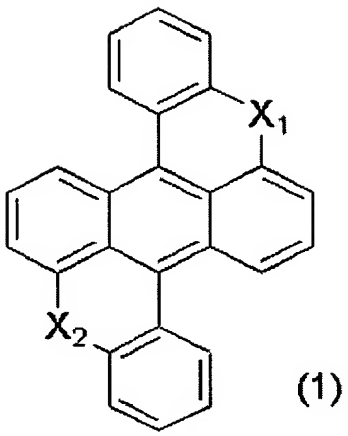


(7)

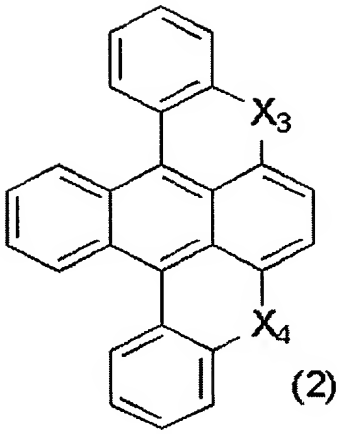
(wherein, X_3 and X_4 each independently represent an oxygen, sulfur,

selenium, or tellurium atom, or NR_{72}; R_{72} represents a hydrogen atom, or an aliphatic hydrocarbon or aromatic residue which may be substituted with an alkyl group, an alkyloxy group, an aromatic residue, an aromatic oxy group, or a halogen atom; R_{58} to R_{71} each represent a hydrogen atom, a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group or a halogen atom, an aromatic residue which may be substituted with an aromatic residue, or an aromatic oxy group, an alkyl group, an alkyloxy group or a halogen atom; at least one of R_{58} to R_{71} represents a halogen atom, an alkyl group which may be substituted with an aromatic residue, an aromatic oxy group, an alkyloxy group or a halogen atom, or an aromatic residue which may be substituted with an aromatic residue, an aromatic oxy group, an alkyl group, an alkyloxy group or a halogen atom; and the neighboring groups among the substituent groups R_{58} to R_{72} may bind to each other forming a ring(s) which may be substituted.).

25. A method of producing a condensed polycyclic compound having the basic skeleton represented by the following General Formulae (1) and (2):

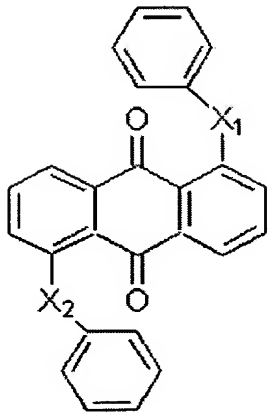


(1)

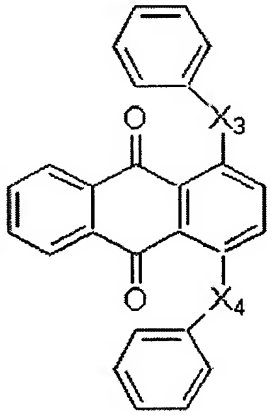


(2)

characterized by ring-closing a compound having the basic skeleton represented by the following General Formulae (8) and (9):



(8)



(9)

(wherein, X_1, X_2, X_3 and X_4 are the same as those described above.), in the presence of a sulfonic acid compound.

26. The method of production according to Claim 25, wherein the sulfonic acid compound is sulfuric acid, an alkylsulfonic acid which may be substituted, or an aromatic sulfonic acid which may be substituted.